



# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ksw/ch39460	<b>FOR FURTHER ACTION</b>		See Form PCT/PEA/416
International application No. PCT/GB2004/004343	International filing date (day/month/year) 13.10.2004	Priority date (day/month/year) 22.10.2003	
International Patent Classification (IPC) or national classification and IPC A01J7D4, A01J7D2			
Applicant DUKE, James Richard John			
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 6 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p style="margin-left: 20px;">a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 4 sheets, as follows:</p> <p style="margin-left: 40px;"><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p style="margin-left: 40px;"><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p style="margin-left: 20px;">b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in computer readable form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>			
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the opinion</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input checked="" type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input type="checkbox"/> Box No. VIII Certain observations on the international application</p>			
Date of submission of the demand  22.08.2005		Date of completion of this report  25.11.2005	
Name and mailing address of the international preliminary examining authority:   European Patent Office - P.B. 5818 Patentlaan 2 NL-2280 HV Rijswijk - Pays Bas Tel. +31 70 340 - 2040 Tx: 31 651 epo nl Fax: +31 70 340 - 3016		Authorized Officer  Moeremans, B  Telephone No. +31 70 340-4434  	

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**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/GB2004/004343

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**Box No. I Basis of the report**

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1. With regard to the **language**, this report is based on the international application in the language in which it was filed, unless otherwise indicated under this item.
  - ☐ This report is based on translations from the original language into the following language , which is the language of a translation furnished for the purposes of:
    - ☐ international search (under Rules 12.3 and 23.1(b))
    - ☐ publication of the international application (under Rule 12.4)
    - ☐ international preliminary examination (under Rules 55.2 and/or 55.3)
2. With regard to the **elements\*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

**Description, Pages**

1-11 as originally filed

**Claims, Numbers**

1-25 as amended (together with any statement) under Art. 19 PCT

**Drawings, Sheets**

1/3-3/3 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
    - ☐ the description, pages
    - ☐ the claims, Nos.
    - ☐ the drawings, sheets/figs
    - ☐ the sequence listing (*specify*):
    - ☐ any table(s) related to sequence listing (*specify*):
  4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
    - ☐ the description, pages
    - ☐ the claims, Nos.
    - ☐ the drawings, sheets/figs
    - ☐ the sequence listing (*specify*):
    - ☐ any table(s) related to sequence listing (*specify*):

\* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT  
ON PATENTABILITY**

International application No.  
PCT/GB2004/004343

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**Box No. IV Lack of unity of invention**

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1. ☐ In response to the invitation to restrict or pay additional fees, the applicant has:
- ☐ restricted the claims.
  - ☐ paid additional fees.
  - ☐ paid additional fees under protest.
  - ☐ neither restricted nor paid additional fees.
2. ☒ This Authority found that the requirement of unity of invention is not complied with and chose, according to Rule 68.1, not to invite the applicant to restrict or pay additional fees.
3. This Authority considers that the requirement of unity of invention in accordance with Rules 13.1, 13.2 and 13.3 is
- ☐ complied with.
  - ☒ not complied with for the following reasons:  
**see separate sheet**
4. Consequently, this report has been established in respect of the following parts of the international application:
- ☒ all parts.
  - ☐ the parts relating to claims Nos. .

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**Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

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1. Statement

Novelty (N)	Yes: Claims	1-25
	No: Claims	
Inventive step (IS)	Yes: Claims	1-25
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-25
	No: Claims	

2. Citations and explanations (Rule 70.7):

**see separate sheet**

**Re Item IV**

**Lack of unity of invention**

There are 2 inventions claimed in the present international application, covered by the following groups of claims:

- Group 1: claims 1-12: teat cup and milking cluster wherein the nozzle means is arranged to discharge fluid in a direction towards the discharge passageway of the liner;
- Group 2: claim 13-25: milking equipment and method of milking, wherein the treatment fluid is discharged into the head portion of the teat cup and on to the teat as the teat cup is withdrawn.

It is considered that the application does not comply with the requirement of unity of invention (Rule 13.1 PCT) for the reasons indicated below.

The definitions of the different claimed inventions are only intended to identify said inventions in a concise manner. They may well, as such, comprise terms or generalisations which upon a close analysis could be found to extend the defined subject-matter beyond the contents of the applications as filed.

Document EP-A-0 277 396 discloses (see figure 2) a teat cup, a milking cluster, a milking equipment and a method with nozzle means (61) for discharging fluid into the head portion of the liner.

- The special technical features, as defined in Rule 13.2 PCT, of the first group of claims, which are intended to be a contribution over this prior art, i.e. the nozzle means which is arranged to discharge fluid in a direction towards the discharge passageway of the liner, apparently solve the problem of flushing the interior of the liner when the teat cup is in an inverted rest position after take-off.
- The special technical features, as defined in Rule 13.2 PCT, of the second group of claims, which are intended to be a contribution over said prior art, i.e. discharging the treatment fluid into the head portion of the teat cup and on to the teat as the teat cup is withdrawn apparently solve the problem of coating the teat with treatment fluid.

No same or similar special technical features can be determined and different underlying

problems are solved. Moreover, it is clear that the 2 claimed inventions can be applied independently of each other, i.e they are not necessarily inter-related.

It appears therefore that no technical relationship between the various claimed inventions exists involving one or more of the same or corresponding special technical features, beside the common and already well known feature of the teat cup, the milking cluster, the milking equipment and the method disclosed in document EP-A-0 277 396. The 2 groups of claims are thus not so linked as to form a single general inventive concept.

**Re Item V**

**Reasoned statement with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

Reference is made to the following documents:

- D1: EP-A-0 277 396
- D2: GB-A-918,766
- D3: EP-A-1,219,167
- D4: WO-A-01/17338
- D5: EP-A-0 543 463

1. Document D1, which is considered to represent the most relevant state of the art, discloses (see figure 2) a teat cup with a nozzle means (61) for discharging fluid into the head portion of the liner, from which the subject-matter of claim 1 differs in that the nozzle means is arranged to discharge fluid in a direction towards the discharge passageway of the liner
  - 1.1. The subject-matter of **claim 1** is therefore new (Article 33(2) PCT).
  - 1.2. The problem to be solved by the present invention may be regarded as to flush the interior of the liner when the teat cup is in an inverted rest position after take-off
  - 1.3. The solution to this problem proposed in **claim 1** of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons:  
Starting from the teat cup disclosed in figure 2 of D1, the skilled person would:
    - either come to the solution disclosed in figure 3 (nozzles 17) of D1;

- or come to the solution disclosed in D5 (see figures 2, 3 and 5; see column 3, lines 36-53) for solving the problem posed.

Therefore, starting from the embodiment of figure 2 in D1, the skilled person would not modify the existing nozzle means such as claimed in order to solve the problem posed.

- 1.4. **Claims 2-12** are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.
2. Document D1, which is considered to represent the most relevant state of the art, discloses (see figure 2) a milking equipment and method of milking, wherein the treatment fluid is discharged into the head portion of the teat cup and on to the teat, from which the subject-matter of claim 1 differs in that the treatment fluid is discharged into the head portion of the teat cup and on to the teat as the teat cup is withdrawn.
- 2.1. The subject-matter of **claims 13 and 19** is therefore new (Article 33(2) PCT).
- 2.2. The problem to be solved by the present invention may be regarded as to coat the teat with the treatment fluid.
- 2.3. The solution to this problem proposed in **claims 13 and 19** of the present application is considered as involving an inventive step (Article 33(3) PCT) for the following reasons: There is no hint in the prior art documents suggesting to discharge the treatment fluid on the teat during the withdrawal of the teat cup in order to solve the problem posed. The skilled person has no reason to modify the existing equipment and method, which already perfectly solve the problem posed.
- 2.4. **Claims 14-18, respectively 20-25** are dependent on claim 13, respectively claim 19 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

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1. A teat cup (1) comprising a flexible liner (3) for engaging about a teat of an animal to be milked, said liner having a head portion (6), at one end, provided with a mouth (7) through which the teat is engageable with the liner, and a milk discharge passageway (4a) at the opposite end, and nozzle means (13) for discharging fluid into the head portion (6) of the liner, characterised in that the nozzle means (13) is arranged to discharge fluid in a direction towards the discharge passageway (4a) of the liner (3).

2. A teat cup as claimed in claim 1, wherein the head portion (6) of the  
10 liner has an internal annular cavity (9) which, when the teat cup is engaged  
with an animal's teat, forms a void (10) between the side of the teat and the  
interior of the head portion, and wherein the nozzle means (13) is arranged to  
discharge fluid into the cavity (9) in the head portion.

3. A teat cup as claimed in claim 1 or 2, including a non-return valve (35) connected to the nozzle means and via which fluid is supplied to the nozzle means.

4. A teat cup as claimed in claim 1, 2 or 3, including a shut-off valve (20) connected to the discharge passageway (4a) of the teat cup for shutting off fluid flow from the teat cup into a milk tube downstream of the teat cup.

20 5. A teat cup as claimed in claim 4, wherein the shut-off valve (20) comprises a valve body (21) having a milk passageway (22) connected to the liner (3), a valve chamber (25) in the valve body connected to the milk passageway via an opening (26) in the wall of the passageway (22), a valve member (27) in the form of a flexible membrane disposed in sealing relation  
25 between the chamber (25) and the opening (26), and means (29) for connecting the chamber to a source of fluid pressure, whereby the application of fluid pressure to the chamber (25) extends and/or expands the membrane through the opening (26) into the milk passageway so that it seals the passageway (22) and shuts off fluid flow therethrough.

30 6. A teat cup as claimed in claim 5, wherein the membrane valve member (27) has a cap-like shape which, in the unactuated position of the valve member, projects into the valve chamber (25) with the cavity in the cap facing the passageway (22), whereby application of fluid pressure to the chamber (25) turns the cap valve member inside out so as to project across

the passageway (22) in sealing relation with the wall or walls of the passageway.

7. A teat cup as claimed in claim 5 or 6, wherein the valve chamber (25) is connectable to a source of vacuum upon removal of the fluid pressure from the chamber, whereby to return the membrane (27) to its unactuated position within the valve chamber.

8. A teat cup as claimed in any preceding claim 4 to 7, including a drain port (37) on the upstream side of the shut-off valve for enabling trapped fluid to drain from the liner (3) in the event of the teat cup being held in a position in which the head portion (6) of the liner is uppermost, said drain port being controlled by a non-return valve (38).

9. A teat cup as claimed in claim 8, wherein the non-return valve is a flap valve (38).

10. A teat cup as claimed in any preceding claim, wherein the nozzle means comprises a single nozzle (12).

11. A teat cup as claimed in any preceding claim, including a delivery tube (14) connected to the nozzle means (13) for supplying fluid thereto, said delivery tube being attached to or integral with the teat cup.

12. A milking cluster comprising a plurality of teat cups (1) as claimed in any preceding claim, a plurality of short milk tubes (11) respectively connecting the discharge passageways (4a) of the teat cups to a clawpiece which collects milk discharged from the teat cups preparatory to onward delivery.

13. Milking equipment including a milking cluster comprising a plurality of teat cups (1), each of which comprises a flexible liner (3) for engaging about a teat of an animal to be milked, the liner having a head portion (6), at one end, provided with a mouth (7) through which the teat is engageable with the liner, and a milk discharge passageway at the opposite end, nozzle means (13) for discharging fluid into the head portion (6) of the liner, a plurality of short milk tubes respectively connecting the discharge passageways of the teat cups to a claw piece which collects milk discharged from the teat cups for onward delivery, and a cluster remover for effecting take-off of the cluster from the animal's udder, characterised by control means for initiating supply of treatment fluid to the nozzle means of the teat cups as the teat cups are



withdrawn from the teats so that withdrawal of the teat cups wipes the fluid down the teats.

14. Milking equipment as claimed in claim 13, wherein the nozzle means (13) of each teat cup is arranged to discharge fluid in a direction towards the discharge passageway (4a) of the associated liner (3).

15. Milking equipment as claimed in claim 13 or 14, including a non-return valve (35) connected to the nozzle means and via which fluid is supplied to the nozzle means.

16. Milking equipment as claimed in claim 13, 14 or 15, wherein the nozzle means of each teat cup comprises a single nozzle (12) directed into an internal annular cavity (9) within the head portion (6) of the associated liner.

17. Milking equipment as claimed in claim 13, 14, 15 or 16, including a shut-off valve (20) connected to the discharge passageway (4a) of each teat cup for shutting off fluid flow from the teat cup to the claw piece.

18. Milking equipment as claimed in claim 17, including a drain port (37) on the upstream side of each shut-off valve for enabling trapped fluid to drain from the associated liner (3) in the event of the teat cup being held in a position in which the head portion (6) of the liner is uppermost, said drain port being controlled by a non-return valve (38).

19. A method of milking comprising the steps of applying a teat cup (1) to a teat of an animal to be milked, said teat cup including a flexible liner (3) engaging about the teat, and having a head portion (6), at one end, provided with a mouth (7) through which the teat is engaged with the liner, and a milk discharge passageway (4a) at the opposite end, activating the cup to perform a milking operation, and, when the milking operation is terminated, discharging treatment fluid into the head portion (6) of the liner (3) and withdrawing the teat cup from the teat, characterised by discharging treatment fluid into the head portion (6) of the teat cup (1) and on to the teat as the teat cup is withdrawn, and utilising withdrawal of the teat cup to wipe the fluid down the teat.

20. A method as claimed in claim 19, including detecting when milking is to be terminated and, in response to said detecting step, withdrawing the teat cup (1) from the teat and discharging treatment fluid into the head portion (6)

of the teat cup and onto the teat such that withdrawal of the teat cup from the teat substantially coats the teat with the treatment fluid.

21. A method as claimed in claim 19 or 20, wherein the treatment fluid is discharged into a void (9) formed between the teat and the head portion (6) of the liner (3).

22. A method as claimed in claim 19, 20 or 21, wherein the discharge of fluid into the head portion (6) of the teat cup is controlled by a non-return valve.

23. A method as claimed in claim 19, 20, 21 or 22, including the steps of allowing the teat cup (1) to fall into an inverted position, after withdrawal from the teat, with the head portion (6) of the teat cup being directed downwardly, and flushing the interior of the liner (3) with treatment fluid, washing and/or drying fluid discharged upwardly into the liner from the head portion (6).

24. A method as claimed in any preceding claim 19 to 23, including the step of shutting off the discharge passageway (4a) of the liner (3) upon withdrawal of the teat cup so as to prohibit fluid from contaminating harvested milk.

25. A method as claimed in any preceding claim 19 to 24, including the step of applying a pulse of compressed air to the interior of the head portion (6) of the liner, subsequently to the discharge of fluid thereinto, so as to facilitate removal of the teat cup (1) from the teat.

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